Artisanal and Small-scale Mining and the Sustainable Development Goals: Opportunities and New Directions for Sub-Saharan Africa

Gavin Hilson and Roy Maconachie

Abstract

This paper explains how formalizing and supporting artisanal and small-scale mining (ASM) – low-tech, labor-intensive mineral processing and extraction – would help governments in sub-Saharan Africa meet a number of their targets linked the Sustainable Development Goals (SDGs). While most of the men and women found working in ASM in the region choose to operate without the requisite permits and are rarely monitored or regulated, the local impacts of their activities are significant. After examining the long historical trajectory that has relegated most ASM activities in sub-Saharan Africa to the informal economy, three of the sector's more obvious economic impacts are reviewed: its contribution to regional mineral outputs; how operations create employment opportunities for millions of people directly, and millions more in the downstream and upstream industries they spawn; and the links the sector has with subsistence agriculture, dynamics which have important implications for food security and gender equality. These contributions alone are sufficient grounds for featuring ASM more prominently in the plans, policies and programs being launched in sub-Saharan Africa in a bid to help the region's governments meet their commitments to the SDGs.

1. Introduction

On 19 July 2016, the United Nations Development Program, in collaboration with Columbia University, the UN Sustainable Development Solutions Network (SDSN) and the World Economic Forum, unveiled the final version of its *Mapping Mining to the Sustainable Development Goals: A Preliminary Atlas* (UNDP, 2016a). The document argues that foreign-financed large-scale mining stimulates economic growth and alleviates significant poverty in developing countries, in the process contributing to the Sustainable Development Goals (SDGs). Publication of the *Atlas*, however, has come at a time when skepticism over the viability of export-led capital-intensive resource extraction as a development strategy is mounting. Critics of the mining industry cite the enclave nature of large-scale resource extraction, its failure to catalyze linkages and downstream/upstream growth, and how companies are given generous tax breaks and not required to invest locally as the main reasons why, from a human development perspective, this approach has yielded disappointing results (e.g. Ferguson, 2005; Campbell, 2012; Hilson, 2012a). While acknowledging that large-scale mining "has also contributed to many of the problems that the [Sustainable Development Goals] SDGs are trying to address," the *Atlas* attempts to showcase throughout – at times, overzealously – the economic importance of the sector's activities, including how globally, it employs 2.5 million people; can fuel infrastructural development and innovation, and bring investment to, and alleviate poverty in, remote areas "at a game changing scale over long time horizons"; and how, in many low- and middle-income countries, it already accounts for 60-90% of Foreign Direct Investment, 30-60% of total exports, up to 20% of government revenues and up to 10% of national income. For these reasons, the *Atlas* claims, "mining and metals have an important role to play in the SDG agenda" (p. 11).

Promoting what is potentially an untenable extractive industries-led development strategy, however, is by no means the biggest problem with the *Atlas*. It is rather its curious decision to deliberately avoid any discussion on the importance of artisanal and small-scale mining (ASM) – low-tech, labor-intensive mineral extraction and processing populated mostly by local people – in the context of the SDGs that is its most significant shortcoming. Much like the Millennium Development Goals (MDGs) before them, the SDGs were designed without ASM in mind, which, in the case of sub-Saharan Africa, one of the poorest regions of the world, was a crucial oversight developmentally. Scholarly work produced over the past two decades (e.g. Maconachie and Binns, 2007; Bryceson and Jønsson, 2010; Hilson, 2012b; Tschakert, 2016; McQuilken, 2016; Mutemeri et al., 2016; Oramah et al., 2016; Hausermann et al., 2018) has consistently highlighted the sector's growing economic importance in sub-Saharan Africa. This includes evidence which points to ASM having become the most important rural nonfarm income-earning activity in the region, and how it is largely poverty-driven, populated mostly by people with few, if any, options for alternative employment. The rhetoric suggests that donors and policymakers recognize ASM's economic importance in sub-Saharan Africa but because of a poor understanding of the sector's dynamics, have been reluctant to feature it more prominently in the region's rural development and poverty-alleviation plans and strategies. Indeed, as shall be fully explored in this paper, this disconnect has long historical roots and is by no means merely a contemporary problem.

There was an opportunity to use the *Atlas*, which has been well-received in and donor industry circles,[1] and promises to help shape the role of how the extractive industries can contribute to the SDGs, to help bridge this gap and calibrate development policy to focus more heavily on ASM in poor regions

[1]See e.g. "Sustainable Development Goals and the Mining Sector," www.canadianminingjournal.com/features/sustainable-development-goals-and-the-mining-sector/ (Accessed 13 September 2018); "The Sustainable Development Goals," www.icmm.com/en-gb/metals-and-minerals/making-a-positive-contribution/sdgs (Accessed 30 December 2018); "CIRDI and the UN Sustainable Development Goals," https://cirdi.ca/wp-content/uploads/2018/02/CIRDI-and-the-SDGs.pdf (Accessed 3 January 2019).

of the world such as sub-Saharan Africa. But it rather attempts to *disassociate* ASM from the broader extractive industries and development agenda:

> Artisanal mining tends to be most common in poor areas, magnifying its developmental implications and risks. ASM generates employment and income, but it is not always safe, well – monitored, legal or regulated. ASM activities can cause substantial negative environmental, health and social impacts , and its informal nature also can make ASM an easy source of income for organized crime and armed conflicts. The implications are clear for SDG1 (End Poverty), SDG3 (Good Health and Well -Being), SDG8 (Decent Work and Economic Growth), SDG15 (Life on Land) and SDG16 (Peace and Justice; Strong Institutions). The Atlas focuses on large -scale mining, but artisanal and small -scale mining is discussed when it directly relates to LSM. The scale of ASM warrants a separate guide and review to map the opportunities on how ASM can contribute to the SDGs. [p. 16]

For poor regions of the world, however, deliberately excluding ASM from any discussion on extractive industries-led development is inexplicable for two reasons. The first is that a convincing case can be made that the sector also contributes to the SDGs in similar ways to which the *Atlas* argues large-scale mining can in mineral-rich areas of the developing world. The second reason is that it comes at a time when the need for fresh ideas on how to balance, support, and promote the growth of both branches of the mining sector in the developing word for economic gain has never been more pressing.

This article responds directly to this critical oversight, focusing on the case of sub-Saharan Africa to argue how a supported and better regulated ASM sector can contribute to, and speaks to the core themes of, the SDGs. With their motto of "Leaving No-One Behind," the SDGS have, from the time of their conception, appealed to policymakers in all corners of the region. Specifically, host African governments "have embedded the SDGs into their national development strategies" (SDGC, 2018, p. 8) believing that they provide the *hitherto* elusive comprehensive and flexible framework needed to address comprehensively the challenges they face today. The list of concerns requiring immediate attention includes how to raise the living standards of 41% of the population, which subsists on less than US$1.25/day; reducing a bloated under-nourishment prevalence rate of 23%; decreasing markedly the world's highest maternal mortality rate; and improving education facilities for the region's children, an estimate one-third of whom between the ages of 12 and 14 and more than half between the ages of 15 and 17 are not in school (Cook et al., 2017). Policies and programs implemented in the region in a bid to fulfil the 169 targets linked to the SDGs are expected to complement the 20 goals and accompanying 174 targets enshrined in the Africa-driven *Agenda 2063: The Africa We Want*, each of which focuses on complementary themes, including social and human capital development, inclusive economic growth, peaceful societies, accountable institutions, and environmental sustainability. Nevertheless, the SDGs are lofty targets, given the context in question: a region of the world where there are not only huge development challenges such as those identified above but also where host governments must find ways to stimulate economic development in a landscape where only 42.8% of the population has access to electricity and manufacturing (added-value) activity accounts for a paltry 10% of GDP and with limited opportunities for further growth in the short term.[2] All development strategies, therefore, must be investigated thoroughly and exhausted by the region's governments in their bids to meet ambitious targets set under the SDGs. It is argued here that the formalization of, and intensified support to, ASM is one low-cost yet potentially effective option worth pursuing.

The article begins by elaborating on the points raised in this introduction to contextualize further why host governments and donors have failed to recognize the economic benefits a formalized ASM sector could bring to the region. As already stated, there are long historical roots to this lack of recognition,

[2] *Source*: World Bank Indicators (https://data.worldbank.org/).

and tracing the genealogy of this disconnect remains vital for understanding the contemporary challenges that are faced. Such a longitudinal perspective, in itself, is an important contribution of this article, as it provides a much more grounded understanding of why ASM has failed to become embedded in rural development policy. with this understanding, the article goes on to review how, specifically, a formalized and supported ASM sector contributes to the SDG targets set for sub-Saharan Africa, in the process building a case for its inclusion in the region's broader development architecture. The article concludes by outlining ways in which to build these ideas into a regional policy machinery which, to date, has overlooked the developmental attributes of the sector almost entirely.

2. Artisanal and Small-Scale Mining and the SDGs in Sub-Saharan Africa: Navigating a Contested Terrain

While it is clear that the *Atlas* pushes ASM to the periphery of development strategy, what is perhaps more concerning is its failure to ignite discussion to help change an outdated narrative on mining and development: specifically, for failing to highlight the importance of implementing extractive industries-focused development policies and strategies with *both* branches of the sector in mind. The ASM operators and large-scale mineral extraction activities found in sub-Saharan Africa today are organized, structured and operate very differently (Figure 1). Each contributes very differently to development and therefore, warrants separate treatment as the *Atlas* suggests. At the same time, however, this must take place under the same policy umbrella if the returns from both, developmentally, are to be maximized because the successes of one hinge upon the effective management and regulation of the other.

But as will be explained in this section of the article, the repeated failure of governments and donors to consider the needs of ASM has prevented this from taking place and has consequently perpetuated the sector's informality in many poor regions of the world such as sub-Saharan Africa. Prolonged neglect of the sector's needs in policy has pushed it along a current development trajectory which is strongly associated with the "negative environmental, health and social impacts" the *Atlas* refers to. This has also brought its operators into direct contact with large-scale miners, interactions which have frequently culminated in violent conflict. These dynamics persist in sub-Saharan Africa more so than any other mineral-rich section of the developing world. Only global frameworks with the reach and influence of the SDGs, and accompanying guidance documents such as the *Atlas*, can realistically usher in the changes needed to facilitate greater inclusion of a sector such as ASM in the global development policy machinery and give it the "positive" spotlight it deserves. There is not much of a foundation to build on, as the MDGs overlooked ASM outright, the result of their architects paying very little attention to the extractive industries in general.[3] It was not until *The Millennium Development Goals and Small-Scale Mining: A Conference for Forging Partnerships for Action* (World Bank, 2005), an international workshop held 16-17 June 2005 at World Bank headquarters in Washington D.C., that a dialogue on ASM and the MDGs was even initiated. The ideas presented here, however, would fail to gain the traction needed to facilitate changes in policy, and while there was an opportunity for the SDGs and subsequently, the *Atlas*, to revive and further develop this discussion, it failed to materialize. Before explaining why in greater depth ASM is so vital to the livelihoods portfolios of millions of families in impoverished sections of rural sub-Saharan Africa, it is instructive to build on this discussion

[3] There is no obvious reason why the architects of the UN Millennium Project were so dismissive of the importance of extractive industries. One possible reason why is the position of Professor Jeffery Sachs, who was Director of the UN Millennium Development Project and Special Advisor to UN Secretary General Kofi Annan on the Millennium Development Goals, on the role of mining, and oil and gas in development. Prior to his directorship, Professor Sachs published a series of influential pieces on the resource curse (Sachs and Warner, 1997, 2001) which, using time series, argue that developing countries rich in natural resources have underperformed economically.

– specifically, to explain why the sector continues to be on the periphery of development planning, and why building a convincing case for formalizing its activities, with relatable components, will be needed in order to change this.

Figure 1: Comparing artisanal and small-scale mining and large-scale mining

(a) Aligning two (complementary) livelihoods agendas

In previous publications (Hilson and McQuilken, 2014; Hilson, 2016a; Maconachie and Hilson, 2018), opinions are shared on why, despite its rather obvious economic importance and rootedness in many rural societies, ASM has failed to become a point of emphasis in national development programs and poverty alleviation strategies, particularly in sub-Saharan Africa. This section of the paper picks up on key developments that took place at the turn of the century, a point when the social dimension of ASM was beginning to be recognized in the literature and the donor community, coincidentally at a time when the theme of "livelihoods" had started gaining traction on the international development agenda (see e.g. Carney, 1999a, 1999b, Rakodi, 1999). Several policy interventions were made at this time in a bid to graft ASM's social dimension on to what was becoming a rapidly-emerging livelihoods discourse. But the fanfare surrounding moves made by officials at the United Nations Department for Social and Economic Affairs (UNDESA), the International Labour Organization (ILO) and subsequently, the World Bank and UK Department for International Development, to facilitate the fusing of these two agendas was short-lived. Despite going a long way toward deepening understanding of the social

and economic importance of ASM, these actions would, ironically, have the opposite effect: furthering the divide between the sector and the broader development agenda.

What was perhaps most disappointing for those lobbying for greater inclusion of ASM in development policy at the time is that all of the elements needed to facilitate this change appeared to have come to fruition. First, there was a detectable change in rhetoric: a shift in the approach being taken to regulate and support the sector seemed inevitable following the *Seminar on Guidelines for Development of Small-and Medium-scale Mining*, an international gathering of ASM experts organized by UNDESA and other donors in Harare, 1993. The seminar produced dynamic discussions about the social dimension of ASM, and yielded, *inter alia*, a set of guidelines intended as a framework for promoting and developing the sector's activities (Labonne, 1994). Discussions continued in May 1995 at the World Bank-hosted *International Roundtable on Artisanal Mining* (Barry, 1996), a much larger seminar at which experts began to acknowledge, for the first time, key livelihood aspects of the sector, including how 'to a large extent, informal mining is a poverty-driven activity' (p. 1). The ideas debated at both gatherings provided the foundation for one of the more influential texts produced on ASM to date, *Social and Labour Issues in Small-Scale Mining* (ILO, 1999), published by the ILO in 1999. The authors of this landmark text took the discussion one step further, going as far as criticizing the donor community for not recognizing the social dimension on ASM and for failing to adopt a more grassroots, "bottom-up" approach toward regulating the sector. They also offered very convincing explanations for why, in locations such as sub-Saharan Africa, ASM activities are mostly found in the informal economy.

The importance of these discussions cannot be overstated. They not only signified a changing of the guard in the approach being taken to regulate ASM but also proved that some donors were willing to move away from their comfort zones to challenge the dominant technical-oriented strategy long taken to support the sector (see Jennings, 2003). This proved to be the second crucial element: the willingness of these donors to move beyond the rhetoric and to act to implement innovative project work grounded in vogue livelihoods-development jargon. In sub-Saharan Africa, the initial foray into the ASM livelihoods "space" was spearheaded by the UNDESA and UNDP, which jointly launched the *Poverty Eradication & Sustainable Livelihoods: Focusing on Artisanal Mining Communities* project in December 1999 (Labonne, 2003). Focusing on four countries (Mali, Ghana, Ethiopia and Guinea), the project not only mapped the organizational and demographic structures of ASM camps but also identified policy options for improving operations and promoting alternative livelihoods. The project's final activity was a workshop, held on 19-22 November 2002 in Yaoundé, Cameroon, and attended by 70 experts from sub-Saharan Africa and elsewhere. Here, the findings from the four studies were shared and recommendations were made on how to "Integrate ASM policy into the Poverty Reduction Strategy Paper (PRSP) process." The recommendations presented would become the building blocks of the *Yaoundé Vision Statement*, a blueprint which offers guidance on how to "Contribute to sustainably reduce poverty and improve livelihood in African artisanal and small-scale mining communities by the year 2015 in line with the Millennium Development Goals" (Labonne, 2002, p. 22).

Complementary foundational work was also undertaken at this time, headlined by activities carried out as part of the DFID-funded *Livelihoods Analysis of the Artisanal and Small-Scale Mining Sector*, 2003, and the series of studies linked to the Mining, Minerals and Sustainable Development (MMSD) Project (2000-2002), a multifaceted policy and research dialogue funded by nine of the biggest mining companies at the time. The former featured inputs from academic and industry partners and uncovered evidence which further legitimized the importance of ASM in rural sub-Saharan Africa, drawing on findings from research conducted mostly in Tanzania and Ghana. Although funded by a different donor, the ASM segment of the project exhibited all of the hallmarks of a rural livelihoods study, and had the look of a second phase of, or follow-on exercise from, the aforementioned

UNDESA/UNDP project. Under the latter, a range of timely, comprehensive country-level ASM studies were commissioned, including for sub-Saharan Africa, separate analyses for Ghana, Mali, Burkina Faso and the Southern African Development Community (Hilson, 2001; Gueye, 2001; Keita, 2001; Drescheler, 2001).

The third and final element of the equation was the establishment of a mouthpiece for ASM capable of lobbying on behalf of the sector's operators. The opportunity to create this platform came about, rather unexpectedly, at an MMSD workshop held in London in March 2001. Here, in a rather *ad hoc* fashion, Communities, Artisanal and Small-Scale Mining (CASM) was launched. Intended as a platform for supporting and disseminating information on ASM, CASM was initially conceptualized "as a multi-donor networking and coordination facility whose mission is to 'reduce poverty by improving the environmental, social and economic performance of artisanal and small-scale mining in developing countries'" (p. 1). Its four pillars were as follows: 1) Better governance and formalization of the sector; 2) Initiatives to enhance environmental and technical performance, and socio-economic development; 3) Network building for more effective partnerships; and 4) Knowledge development and best practice sharing. The CASM platform would quickly become a source of inspiration for ASM operators worldwide, promising to provide much-needed representation for the industry in key development dialogues between governments, donors and the private sector.[4] To address concerns in a more decentralized and streamlined manner, regional branches of CASM were established, including CASM Africa.

To summarize, by the early-2000s, all of the ingredients needed to showcase ASM's livelihoods dimension and more broadly, its economic importance, with a view toward stimulating the policy changes needed to make the sector more of a focal point in development policies seemed to be in place. Sector-specific interventions were being designed and implemented with broader international development architecture – which, at the time, was the Millennium Development Project and accompanying MDGs – in mind. But in sub-Saharan Africa, very little progress would be made, and consequently, the ASM sector would continue to expand and become more rooted in the informal economy, the outcome of prolonged neglect of its needs in policy. Before building a case for how, if supported, formalized and regulated more effectively, ASM could contribute enormously to the SDGs in sub-Saharan Africa, some explanations for why, across the region, the sector remains largely-informal, are provided. This brief analysis offers a glimpse of the challenges that must be overcome and themes which must be interrogated in order to make ASM more of a centerpiece of the region's development strategy.

(b) Artisanal and small-scale mining: A neglected enterprise in rural sub-Saharan Africa

There is no consensus on why ASM failed to gain much traction on the development agenda in sub-Saharan Africa in the late-1990s and early-2000s. It was likely a confluence of different factors which, in combination, proved to be too much of a deterrent for host governments contemplating the move to make the sector more of a focal point in their rural development and poverty alleviation strategies. Two of the more probable explanations for why this change failed to materialize are provided here.

The first is that the combined efforts of the likes of the UNDESA, UNDP and DFID were likely not as impactful as they appeared. In each "enlightened" organization, outside of the small group of individuals lobbying, at international gatherings, for ASM to be grafted on to the emerging livelihoods agenda at the time and implementing projects with this in mind, most people with influence were ambivalent towards the prospect of committing resources to improving understanding of the sector's dynamics and ultimately, featuring it more prominently in rural development and poverty alleviation

[4] "Issues Brief, the World Bank: Communities, Artisanal and Small-Scale Mining," http://siteresources.worldbank.org/INTOGMC/Resources/CASMFACTSHEET.pdf (Accessed 4 November 2018).

strategies. Moreover, these organizations were simultaneously undertaking broader work in the extractive industries "space" which would minimize or even counteract any effort being made to support ASM. For example, in the 1980s and 1990s, several governments in sub-Saharan Africa would implement, under the auspices of the World Bank, major mining sector reform projects. While most featured fairly sizable ASM components, specifically, financial packages amounting to millions of dollars aimed at supporting the sector and for enhancing institutional capacity to regulate its activities, their principal aim was to overhaul policies and restructure institutions to position countries to attract the foreign investment needed to catalyze the growth of large-scale mineral exploration facilities and ultimately, extraction (Campbell, 2003; Hilson, 2012a). Research (e.g. Lange, 2006; Luning, 2012; Patel et al., 2015) has shown that, in following the guidance of Bank officials and implementing generous tax incentives to encourage this investment, the governments of countries such as Ghana, Tanzania and Burkina Faso, were, indeed, very successful in stimulating the expansion of large-scale mineral exploration and extraction. But the demarcation of large plots of land as concessions to foreign companies would stifle simultaneous efforts to formalize ASM. Ironically, the CASM Secretariat, which, during its inaugural years, was headquartered at, and funded by, the World Bank, was, on many levels, being called upon to mitigate problems that the organization it was essentially a part of at the beginning had helped to create.

Similar contradictions in philosophy persisted at the ILO, which, following publication of *Social and Labour Issues in Small-Scale Mining* (ILO, 1999), began to be seen as a champion for ASM. But this proved difficult to reconcile with the organization's lengthy history of profiling the hazards, and health and safety concerns in mining, including its artisanal and small-scale segment (see e.g. ILO, 2000; Walle and Jennings, 2001). It may have also been difficult to see past some of sweeping moves being made by the ILO to eradicate child labor on the one hand, and to accept and embrace calls made in *Social and Labour Issues in Small-Scale Mining* for policymakers to take into greater consideration the social, cultural and livelihoods dimensions of ASM on the other hand. Notably, the International Program on the Elimination of Child Labour (IPEC) identified ASM as one of the "Worst Forms of Child Labour." This spawned a host of ILO-funded projects and studies (ILO, 2004, 2005, 2006, 2007), which sought to draw attention to the child labor phenomenon in the sector in a number of countries in sub-Saharan Africa. The drive to tackle what was believed to be child labor in ASM had reached the point where ILO officials felt justified in making the sector the theme of its 2005 *World Day Against Child Labour*, "A Load Too Heavy" (ILO, 2005; Hilson, 2010). Seven of the 15 delegations in attendance at the launch event in Geneva hailed from sub-Saharan Africa. Even the series of studies funded under the MMSD project need to be viewed with some trepidation, given how the overarching objective of the exercise was to showcase the commitment of multinational corporations to community development in order to build confidence among governments interested in attracting foreign investment to develop their large-scale mineral exploration and mining economies.

The second possible reason is host governments' "preference" for large-scale mining, a fixation Hilson (2019) has coined a "bias" in the extractive industries "space." Proponents of large-scale, export-led mineral development in sub-Saharan Africa would likely rationalize this "bias" as cash-strapped governments desperate to secure an injection of funds, through foreign investment, to develop their economies. Critics, however, would attribute – in this particular case – a large-scale mining "bias" to rent-seeking governments prioritizing low-hanging fruit, specifically, the "easy money" received in the form of permit fees, ground rents, taxes and eventually, royalties. Prioritizing large-scale mine development in sub-Saharan Africa has produced lopsided financial outcomes, with international companies receiving the greatest share of profits and benefits. But while the amounts secured by host governments may be small by comparison, they are still sizable nonetheless, sums which, if managed properly, could alleviate significant poverty region-wide (Table 1). The obvious concern, however, is that these finances are not being reinvested locally by African governments, nor are donors instituting strict guidelines to ensure that this takes place.

Table 1: Revenue from large-scale mining in selected countries in sub-Saharan Africa

Country	**Main mineral(s) be explored/extracted on a large scale**	**Amount in US$ millions[5]**	**Year**	**Mineral Export Dependence (ores, metals and precious stones) as a share of exports (%), 2014-2015**
Mali	Gold	490.40	2015	71
Guinea	Bauxite, gold	753.7	2016	63
Niger	Uranium	635.96	2014	42
Zambia	Copper	845.46	2016	86
Ghana	Gold	1310.79	2014	36
Tanzania	Gold	286.75	2012	42
Burkina Faso	Gold	194.53	2015	69

Sources: data extracted from https://eiti.org/ and UNCTAD, 2016

Thus, what appeared to be a heavy donor focus on developing ASM at the turn of the century was largely a mirage. In sub-Saharan Africa, the freedom afforded to champions of the sector's livelihoods dimension to implement their projects was likely due to a depressed gold price at the time. It had plummeted to US$272.65/oz by the end of 2000, its lowest since 1978, and would remain fairly low between 2001 and 2004, climbing only marginally from US$276.50/oz to US$435.60/oz. This was a turbulent period for multinational mining corporations, a time characterized by major mergers, hostile acquisitions and suspensions of operations, all of which had a major impact on the gold exploration and extraction landscape of sub-Saharan Africa. Some of the more significant developments from this time include Denver-based Newmont Gold Mining's acquisition, in February 2002, of Adelaide-headquartered Normandy Mining, which had numerous Ghana-based projects; the merger of AngloGold and Ashanti Goldfields in 2004, which changed the mineral exploration and mining landscapes in Guinea, Ghana, Tanzania and Mali; and the closure of the high-cost Obuasi surface activities and leaching operations and Ayanfuri Mine in Ghana, and a series of moves made in South Africa to minimize gold production due to the high costs associated with maintaining underground operations. While large-scale gold mine development was not at a compete standstill in sub-Saharan Africa, as evidenced by the growth in production in greenfield sections of the region such as Tanzania and Mali, depressed levels of activity and suspended operations did provide champions of ASM considerable space to maneuver to implement their projects. Once the gold price began to climb rapidly between 2009 and 2012, however, interest in large-scale mining reignited and all momentum behind making ASM a focal point of the region's development strategy quickly dissipated. This was expedited by the untimely exodus of key experts and champions of ASM from a range of donor organizations, which culminated in the abandonment of many of these projects and most importantly, the eventual collapse of CASM in 2010 (Hilson and McQuilken, 2014).

In sub-Saharan Africa, prolonged neglect of ASM has given rise to a sector with very unique attributes. As will be explained, a poor understanding of its activities has spawned inappropriate policy frameworks and regulations. It is also responsible for confining most of the sector's operators to the region's informal economy.

[5] These sus include royalties, various taxes, fines and rents.

(c) Artisanal and Small-Scale Mining: An Informal Sector Enterprise in Rural Sub-Saharan Africa

Before any move can be made to integrate ASM into poverty alleviation and economic development strategies in sub-Saharan Africa, particularly those implemented under the auspices of the SDGs, a clearer picture of why the sector has progressed along the growth trajectory it has is needed. This will require broadening understanding of why most ASM activities in sub-Saharan Africa are found in the informal sector. It will furthermore entail identifying ways in which to connect with, and change the fortunes of, the sector's operators by devising strategies which bring them into the formal economy, and subsequently position them to further drive rural economic development and in ways which "speak" to the SDGs, an overarching policy machinery designed without ASM in mind.

A logical starting point would be to build on the pioneering work undertaken by a number of scholars who have offered convincing explanations for why, worldwide, most ASM activities are found in the informal economy (ILO, 1999; Hentschel et al., 2002; Verbrugge, 2015; Hilson et al., 2018). From the evidence available, the unprecedented growth of informal ASM that has occurred in sub-Saharan Africa specifically during this period is principally the result of a combination of 1) bureaucratic and costly licensing procedures; 2) and a shortage of land on which the requisite permits can be held. In the case of the former, studies have consistently shown over the past two decades that the cost of licensing has inhibited the formalization of ASM in the region: in Liberia, where the ability to secure a Class B License, which costs US$10,000 and must be obtained if any machinery is involved (Van Bockstael, 2014); in Ghana, where, despite ongoing concerns voiced over the costs of a small-scale gold mining license, successive governments have elected to *increase* the fees, including those linked to a rather unnecessary Environmental Impact Assessment (Tschakert and Sinha, 2007; Hilson et al., 2014); in Zimbabwe, where, as Spiegel (2015) explains, during a period of 'crackdown' on illicit gold mining, activities were 'subjected to ever-more-costly, bureaucratic and inaccessible national licensing requirements' (p. 551); and Sierra Leone, where the application fee for a small-scale mining license is US$1000, its renewal is also US$1000, and the annual fee is US$800/ha.[6] In the case of the latter, as a host of examples drawn upon from the likes of Ghana, Tanzania, DR Congo and Sierra Leone illustrate how, in sub-Saharan Africa, a large-scale "bias" has led to huge tracts of land being reserved for, and demarcated to, international mineral exploration and mining companies, thus rendering sizable areas inaccessible to prospective small-scale licensees (Lange, 2006; Patel et al., 2015; Hilson, 2019).

As argued convincingly in the literature, most ASM operators in the region, discouraged by the bureaucracy and costs associated with securing a license, and how there are so few mineralized sections of land that are *not* under concession to foreign multinationals, have elected to forgo the necessary legal procedures to secure their titles. This has produced the pockets of informal ASM activity found scattered across sub-Saharan Africa today, each of which is governed by its own set of rules. Although beyond the scope of the present paper, as shown in a number of studies (e.g. World Bank, 2005; Garrett, 2008; Buxton, 2013), in the absence of government regulation, the region's informal ASM economy has come under the control of a number of different – and predominantly, local-level – actors, including chiefs, middlemen, wealthy landlords and even government officials. These actors have been instrumental in steering the ASM sector in sub-Saharan Africa along its path of informality, the adverse impacts of which donors and host governments have been quick to showcase without offering grounded explanations for why they have come about.

Nearly three decades ago, the World Bank published *A Strategy for African Mining* (World Bank, 1992), which has since become the blueprint for mining sector reform in sub-Saharan Africa. It, however, rather baselessly called on host governments to regulate all levels of mining similarly, arguing that "A state mining enterprise should compete on the same terms as a privately-owned company, foreign on the same terms as national, large companies under the same broad rules as small ones" (p. 22). The

[6] "National Minerals Agency," http://www.nma.gov.sl/home/fees/ (Accessed 12 December 2018).

first comprehensive response to this inappropriateness of this claim was made by ILO officials, who, in the organization's landmark publication, *Social and Labour Issues in Small-Scale Mining* (ILO, 1999), called for the opposite to take place. Recognizing the disadvantageous position prospective small-scale mining licensees are put in under reform, the report argued that "If small-scale mining is to be encouraged to operate legally, legislation must be (at least) even-handed in allowing small-scale miners access to suitable land for prospecting and mining activities" and must also "be 'user friendly' as far as the issuing of permits and the granting of licenses are concerned -- permits that provide clear security of tenure for a reasonable period so that small-scale mining can become established" (np).

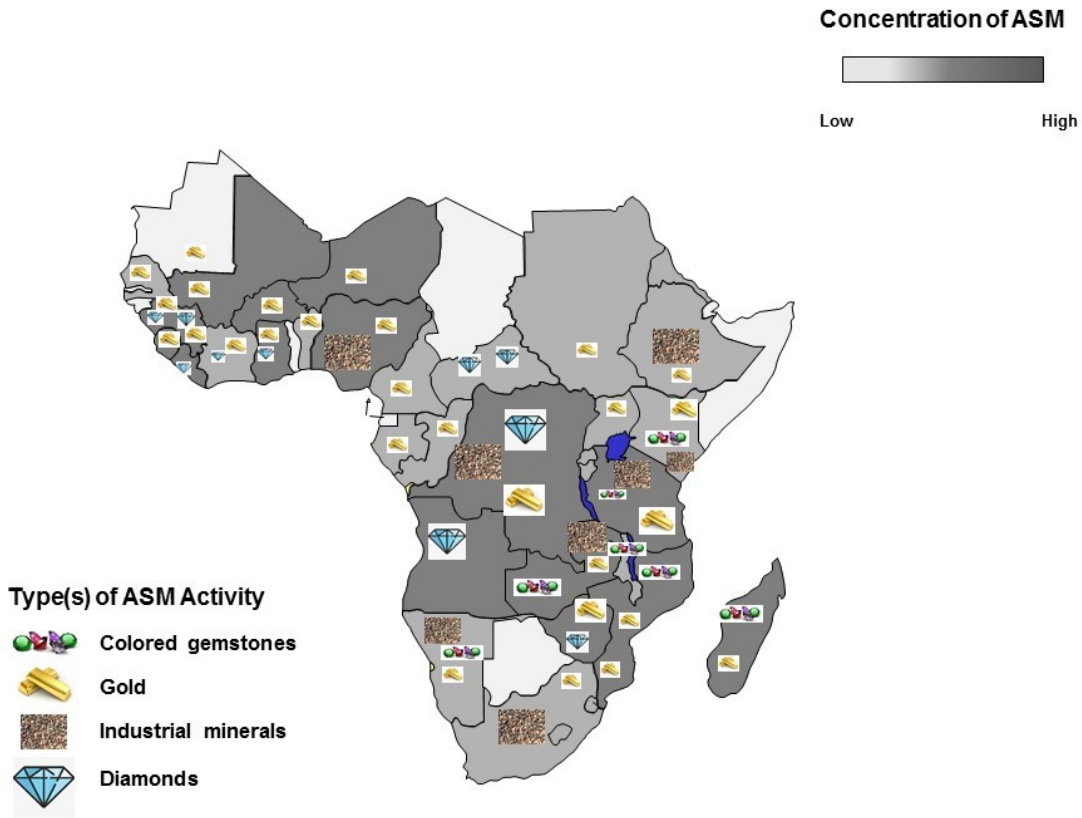
But as already explained, the groundswell for greater inclusion of ASM in international development strategy initiated by this report and subsequently, the MMSD project, failed to ignite the policy changes needed to give the sector the spotlight it needs. Consequently, the extractive industries policy "space" has evolved without fully recognizing the significance of ASM in places such as sub-Saharan Africa, even in cases where the sector *should* be center stage. For example, the Kimberley Process, which was officially launched in 2003 to stem the flow of conflict diamonds, only established its Working Group on Artisanal and Alluvial Production in 2006 (based on formative organizational work undertaken at its Moscow Plenary in November 2005), which it regularly acknowledges as "the youngest working group of the Kimberley Process (KP)," [7] despite small-scale operations – overwhelmingly, those found in sub-Saharan Africa – being the *main* source of these stones. Similarly, the Extractive Industries Transparency Initiative (EITI), a policy intervention conceived to be "the global standard for the good governance of oil, gas and mineral resources," and believed by its champions to be capable of facilitating "transparency and accountability about how a country's natural resources are governed," did not consider focusing on ASM until its 29th board meeting in Congo Brazzaville, April 2015.[8] This avoidance has had consequences, developmentally, for countries such as Liberia, Sierra Leone and the Central African Republic, where most mining activity is carried out on an artisanal and small scale, and in the likes of Ghana, the Democratic Republic of Congo, Mozambique, and other locations in sub-Saharan Africa where it is widespread (see Figure 2).

Failure to give the sector the attention it deserves misses out on an incredibly sizable piece of, and by extension, the level of transparency in, these countries' extractive industries, and consequently, paints an unrepresentative picture of the state of financial and commodity flows in and out of mining. Even in instances where donors and host governments appear to be proactively featuring ASM, there is still a lack of nuance, and a rehashing of existing ideas and/or reference made to outdated policies. The latest example of this is the Africa Mining Vision (AMV), Africa's mining developmental blueprint for the foreseeable future, which, very importantly, has as one of its core pillars *Boosting Artisanal and Small-Scale Mining* and acknowledges that ASM is "both a poverty-driven and a poverty alleviating, finite activity." But at the same time, it effectively undermines these potentially-powerful ideas by championing and using as guidance the *Yaoundé Vision Statement*, which, despite having very little influence and being conceived nearly two decades ago and at a time when gold prices were a fraction of what they are today, the architects of the AMV insist "represents one of the main frameworks for the development of this sub-sector in the continent" (African Union, 2009, p. 28).

[7] "Artisanal and Alluvial Production," www.kimberleyprocess.com/en/artisanal-and-alluvial-production-wgaap (Accessed 12 January 2019).

[8] The idea of featuring ASM more prominently in the EITI Standard was actually debated during parallel workshops held in neighbouring Kinshasa in the Democratic Republic of Congo.

Figure 2: Concentration of artisanal and small-scale mining activity in sub-Saharan Africa



Source: developed from figures compiled by Hilson, 2016a

An additional problem concerns the overarching development policy frameworks implemented in the region, including PRSPs and the New African Partnership for African Development (NEPAD) Vision, which have failed to give ASM much visibility despite being well-positioned to do so. Failure to build a convincing case for ASM's economic importance has, in sub-Saharan Africa, spawned policy interventions that focus mostly on the sector's environmental and adverse societal impacts. At the same time, the architects of these interventions have committed very few resources to advancing understanding of what is fueling the sector's informality, which, again, is the principal reason why these impacts persist in the first place. The Minamata Convention on Mercury Pollution, for example, has galvanized governmental action across sub-Saharan Africa to minimize emissions of mercury that is used to amalgamate gold which, following methylation in the natural environment, bioaccumulates and pose a major threat to human health. The Convention and the series of National Action Plans it has ushered in across the region, however, fail to link this to sector's development trajectory, specifically, its informality (Hilson et al., 2018). Similarly, by downplaying the importance of informal ASM in sub-Saharan Africa, the Dodd Frank Act and accompanying OECD Conflict Minerals legislation have precipitated changes in the likes of the Democratic Republic of Congo that have "deprived hundreds of thousands of artisanal mining communities from their livelihoods" (Stoop et al., 2018, p. 2). Again, rather than focusing on identifying ways in which to formalize the sector, several donors, host governments, the private sector and to some extent, NGOs, have, through policy interventions and selective purchasing, criminalized the activity in DR Congo and the wider Great Lakes Region.

Disinterested politicians, inappropriate policies and regulations, and no clear vision on how ASM should be developed have all played a part in diminishing the confidence of the private sector actors who are increasingly being relied upon by host governments to provide support to licensed operators. Banks in particular have made it very difficult to secure loans, which miners are desperate for in order to purchase the machinery they need to increase their production and ultimately, mechanize, in line with the AMV. For example, a study by Hilson et al. (2014) conducted in Ghana reveals that aside from a small group of local banks willing to provide high-interest loans to selected individuals, there are very few sources of financial support available for licensed small-scale miners. Similarly, in Zambia, Siwale and Siwale (2017) report that formalization has increased access to credit but "not from formal lending institutions nor in a manner that has led to positive outcomes for operators" (p. 197). This has forced operators to rely on government support, which has proved to be woefully inadequate. Here, in the late 2000s, the Ministry of Mines and Mining Development disbursed a series of US$5000 loans to ASM operators as part of its commitment to provide finance to the sector. This, however, represented only a fraction of the amount needed. The Zambia Citizens Economic Empowerment Commission (CEEC), under the Ministry of Commerce, also issued loans amounting to approximately US$43,962 to 14 miners in the country's Eastern Province in 2013 but their maximum credit limit is US$5000, and funds disbursed to the miners averaged US$3200 per head, which proved insufficient to finance any mineral excavation activity.

The failure of development frameworks and extractive industries policies more generally to recognize the economic importance of ASM provides a timely opportunity to showcase the sector's much-overlooked livelihoods dimension. An unpacking of the livelihoods narrative in the sector in the context of sub-Saharan Africa illustrates very clearly why the sector should feature more prominently in the region's plans, programs and policies designed around the SDGs. The next section of the paper emphasizes the more significant contributions the sector makes in sub-Saharan Africa, in the process building a case for its greater inclusion in the region's SDG apparatus, economic impacts which are even visible under a veil of informality.

3. Artisanal and Small-Scale Mining and the Sustainable Development Goals: Building the Case in Sub-Saharan Africa

(a) The context

Most of the analysis presented in the *Atlas*, the point of departure for this article, argues how, by using the SDGs as a guide, the large-scale mining industry can minimize its environmental footprint while simultaneously increasing its social and economic contributions in developing countries. It prefaces these discussions by praising the performance of the sector's companies, stating that "the industry has made significant advances in mitigating and managing such impacts and risks, by improving how companies manage their environmental and social impacts, protect the health of their workers, achieve energy efficiencies, report on financial flows, and respect and support human rights" (p. 3). Its authors are of the view that "both baseline improvements as well as mitigating steps…[should be] considered to be contributions to the SDGs", furthermore pointing out that "While the mining industry is diverse, the scope and nature of typical mining activities highlight some common opportunities to leverage and contribute to the SDGs" (p 3). Not surprisingly, the *Atlas* mostly emphasizes areas that are most relevant to measuring a large-scale mine's *performance* and which are most applicable to a capital-intensive, highly-mechanized industry, including SDG6 ("Clean Water and Sanitation"), SDG7 ("Energy Access and Sustainability"), SDG9 ("Infrastructure, Innovation and Industrialization"), SDG12 ("Responsible Consumption and Production") and SDG13 ("Climate Action").

The *Atlas* also attempts to make a case for how mining companies "can significantly impact local communities, bringing economic opportunities", in the process contributing to SDG1 ("End Poverty"),

SDG4 ("Gender Equality) and SDG10 ("Reduced Inequalities") but in doing so, focuses heavily on its macro-level contributions, specifically the revenues (taxes, royalties, permit fees, etc.) it generates for countries. This, however, presupposes that there are governance structures in place which ensure that these revenues do, in fact, trickle down to the local level, which, as noted, has rarely been the case in sub-Saharan Africa. Moreover, when these "contributions" to local economic development in the region are juxtaposed against those of ASM, which again, the *Atlas* inexplicably chooses to ignore, the narrative changes entirely. As explained at the outset of this paper, a conscious decision was made by the architects of the *Atlas* to omit ASM from the discussion on the grounds that "The scale of ASM warrants a separate guide and review to map the opportunities on how ASM can contribute to the SDGs." But they seem to have done so quite judgmentally, acknowledging, on the one hand, that "ASM generates employment and income" but on the other hand, going to considerable lengths to stress how it "is not always safe, well-monitored, legal or regulated" and that "ASM activities can cause substantial negative environmental, health and social impacts, and its informal nature also can make ASM an easy source of income for organized crime and armed conflicts" (p. 16). Much like large-scale mining, emphasis is placed in this very brief synopsis of the sector on *performance*, which is made very clear in the concluding passage. It states that, "the implications are clear for SDG1 (End Poverty), SDG3 (Good Health and Well-Being), SDG8 (Decent Work and Economic Growth), SDG15 (Life on Land) and SDG16 (Peace and Justice; Strong Institutions)," all of which are performance-related.

When the specific economic contributions of ASM are articulated, however, it becomes very clear how, if properly supported, the sector can help governments in sub-Saharan Africa fulfil targets linked to the SDGs in a number of ways. If anything, producing "a separate guide" for ASM, as the authors of the *Atlas* suggest must take place, should be done so solely on the basis of these contributions, which, at least at the community level and in rural areas of the developing world, greatly exceed those that could possibly be provided by capital-intensive large-scale mines operating in an enclave. In sub-Saharan Africa, based on the evidence, these contributions could be more fully realized if the sector is formalized, which puts its activities in a position to be taxed, better supported, regulated and monitored more effectively. In Uganda, for example, it was recently estimated that if ASM were to be were to be included in the formal sector, the country's GDP would increase by 5%. Moreover, in Rwanda, government revenues from formalized ASM are already significant, contributing close to one fifth of the country's exports (Barreto et al., 2018a).

But these economic impacts are still very visible in the region's informal settings, which studies conducted over the past two decades capture in detail. Many of these contributions speak directly to the SDGs: the youth and parents who work tirelessly at sites to generate earnings to pay for their school fees, as observed during research conducted in Ghana, DR Congo and Rwanda (Hilson and Garforth, 2013; World Vision, 2013; Barreto et al., 2018b); women who "branch out" because of a need to supplement their earnings into, and subsequently gain control of and become empowered by, ASM, as witnessed in Zambia's amethyst trade (Siwale and Siwale, 2017) and Sierra Leone's gold panning economy (Maconachie and Hilson, 2011); and moves made by miners to finance the construction of building infrastructure onsite, including in Ghana, where "*galamsey* [informal miners] operators have put up houses that become beneficial to the community" (MIME Consult, 2002, p. 38), and in Sierra Leone and Côte d'Ivoire, where, as Van Bockstael (2008) explains, one can "Compare for instance the proportion of new corrugated roofs (brilliant white) on houses in Kono (Sierra Leone) or Bibi-Séguéla (Côte d'Ivoire) with those in any non-diamond community elsewhere in the country where the rusty browns will prevail" (p. xxii-xxiii).

The remainder of this section of the article builds on this analysis, focusing on three of the more obvious areas that underscore ASM's economic importance in sub-Saharan Africa and which should feature at the core of any case made for greater inclusion of the sector in the region's plans and programs designed around the SDGs. These are as follows: 1) ASM's contribution to mineral

production and revenue; 2) its contribution to employment; and 3) its links with agriculture. These three contributions are sufficient justification for committing resources to formalizing ASM in sub-Saharan Africa, with a view toward meeting targets set under the SDGs. Each aligns very closely with the "sustainable development priorities" identified in the subregional reports prepared for, and deliberated at, the Africa Regional Consultative Meeting on Sustainable Development Goals, organized by United Nations Economic Commission for Africa in conjunction with the African Union, 31 October to 5 November 2013 (Table 2).

Table 2: An overview of subregional sustainable development priorities in sub-Saharan Africa

Central Africa	**Eastern Africa**	**Southern Africa**	**Western Africa**
1. Promote peace, security and sociopolitical stability 2. Promote good governance and accountability 3. Develop physical, economic and social infrastructure 4. Combat poverty and promote food security 5. Promote green growth and the creation of decent employment 6. Improve access to health for all 7. Ensure high school education and vocational training for all 8. Ensure protection of the environment and promotion of resilience to climate change 9. Promote social inclusion, gender equality and the empowerment of women	1. Achieve sustainable and inclusive growth and economic transformation 2. Sustainable food security accessibility and use 3. Sustainable land management and biodiversity protection 4. Promotion of science and technology for development 5. Disaster risk management 6. Governance, peace and security	1. Sustainable poverty eradication 2. Improved learning 3. Gender equality and empowerment 4. Improvement of health and nutritional status 5. Ensure environmental sustainability 6. Governance and institutions	1. Reduction of extreme poverty and hunger 2. Achieve gender equality, equitable and universal primary and secondary education 3. Improve child and maternal health 4. Universal access to healthcare delivery service 5. Increase and improve infrastructure and urban management 6. Improve inclusive economic growth 7. Achieve structural economic transformation 8. Ensure good governance, peace and security 9. Reduce environmental degradation and pollution (ensure sustainable use and management of natural resources) 10. Enhance regional and global public-private partnerships for development (external financing and partnerships)

Source: UNECA, 2015a

(b) Mineral production and revenue (SDG 8: Decent work and economic growth)

While the data are piecemeal, the estimates available on mineral production offer a clear idea about ASM's economic impact in sub-Saharan Africa. A number of the region's governments are already collecting significant quantities of minerals and earning substantial revenue from resident ASM activities. A commitment to formalization, however, would position them to collect even more revenue from ASM, yielding the design and implementation of improved regulatory apparatuses and revenue collection systems, in the process, improving the capacity of the state to minimize smuggling and capture *hitherto* lost finance. A better regulated ASM sector from which revenues are being captured by the state, including improved monitoring and working conditions, speaks most clearly to SDG 8 ("Decent work and economic growth"), which focuses on providing full employment for all age groups, as well as developing work, education, and training programs for youth.

Without a comprehensive understanding of the dynamics the region's networks ASM sites are linked to, and the supply chains the predominantly informal activities found here are a part of, details of the fuller picture will always remain elusive. It has long been assumed that ASM accounts for 15-20 percent of global nonfuel mineral output (Noestaller, 1987; ILO, 1999). In sub-Saharan Africa specifically, more recently, it has been suggested that the sector accounts for 18 percent of the region's gold, nearly 100 percent of its cobalt, 15-20 percent of its diamonds and most of its colored gemstone production (African Union, 2009). A large share of the data relied upon to make these calculations, however, are based on declared exports or what host governments end up recording that they have collected. Tracking these data is now fairly straightforward due to the emergence of several online repositories established in response to policy interventions which call for more comprehensive revenue tracking in-country, such as the aforementioned Kimberley Process and EITI. Notable examples include Liberia, where, since 1 January 2018, there have been 13 Class B licenses and 703 Class C licenses issued,[9] each fetching an annual fee of US$10,000 and US$150, respectively; Sierra Leone, where only two Small-Scale Mining Licenses were issued in 2018, both to Dojo Resources Ltd. (fetching a monitoring fee of US$3280 and Annual License Fee of US$32,800);[10] and Ghana, where communications with government staff reveal that, prior to a ban on all ASM activities, which lasted from April 2017 until December 2018, there were in the range of 1200 active Small-Scale Gold Mining Licenses.[11]

Ironically, it is the quasi-informality which many host governments have been complicit in fueling the growth of and preserving that has illuminated the economic contribution ASM makes in sub-Saharan Africa. For Liberia and Sierra Leone, the figures available for diamonds and gold are based solely upon what licensed buyers decide to declare and ultimately export through legal channels. In the case of the former, based on the most recent available data, there were 18,868 oz of gold, valued at US$20,609,829, declared at the Ministry of Mines and Energy, in 2014, and 56,289 carats of diamonds, valued at US$30,701,453, exported in 2017.[12] The government has failed to disaggregate the data but with so few companies operating in the country, most of the gold and diamonds declared likely originates from both registered and informal artisanal mines, purchased by licensed brokers and dealers. In the latter, the records show that in 2017, 289,141 carats of diamonds, valued at US$122,316,627,[13] were produced in the country, mostly on a small scale, and collected by licensed Alluvial Diamond Dealers and Alluvial Diamond Exporters. In Ghana, in 2016 (the last full year of mineral production in the country prior to the aforementioned ban), 30 percent of declared gold

[9] "Ministry of Mines and Energy, Liberia – Online Repository," https://liberia.revenuedev.org (Accessed 29 December 2018).
[10] "GoSL Online Repository," https://sierraleone.revenuedev.org/ (Accessed 29 December 2018).
[11] Personal Communication, Government of Ghana official, 11 July 2018.
[12] Data obtained from the Ministry of Mines and Energy, Liberia.
[13] "Sierra Leone," https://www.kimberleyprocess.com/en/sierra-leone-0 (Accessed 12 December 2018).

production (1,134,635 of 3,754,668 oz) originated from ASM sites (Government of Ghana, 2017). Most of this gold, however, was purchased by *licensed* government buyers from *unlicensed* miners.

Many countries in the region have also passed new regulations and facilitated the establishment of companies which have inadvertently "legitimized" this informality. One illustrative example is Tanzania, where, as Mutagwaba et al. (2018) explain, ASM could account for 13.75 tons of gold, only 1.1 tons of which is officially declared (representing 10 percent of the country's total production). Here, procedures for a Processing, Smelting and Refining license were enshrined in the *Mining Act 2010* (Kibugi et al., 2015). It can be secured by individuals interested in processing gold who are typically seeking authorization to construct a cyanide vat leaching facility. They are required to complete an environmental management, haulage and processing inputs plans, and to pay compensation to locals for lands used. But the government awards these licenses knowing that the holder purchases gold-aggregated ores, the origins of which are unknown, from illicit artisanal miners. A similar arrangement persists in Ghana, where Sankofa Gold, a subsidiary of the government-owned Ghana National Petroleum Corporation (GNPC), purchases gold-aggregated ore from unlicensed artisanal miners to process (Geenen, 2016). Most of the ore processed originates from the nearby localities of Bogoso and Prestea, where tens of thousands of artisanal operators are working illegally on concessions that have been demarcated to large-scale mining and mineral exploration companies. In the DR Congo, which boasts one of the more complex informal ASM economies in sub-Saharan Africa, a similar quasi-informal setup has emerged in the cobalt mining sector. The country produces over 50 percent of the world's cobalt (Shedd et al., 2017),[14] the majority of which originates from small-scale mines. The management of electronics and automobile companies interested in establishing a traceable route to the source of this cobalt have realized, however, that a sizable share of supply *cannot* be tracked because its origin is not known and, as Zeuner (2018) explains, "is passed on to the purchasers of the artisanal cobalt who buy cobalt ore in depots, or open-air markets; representing mostly Chinese companies" (p. 1).

What these examples clearly illustrate is that even in an informal state, ASM is making sizable economic contributions across sub-Saharan Africa. But the analysis more importantly raises the question: how much *more* could the region's governments gain, financially, from the sector if they were to commit fully to formalizing the sector's activities, and in cases such as Tanzania, Ghana and DR Congo, why are they not particularly proactive in doing so? This would yield improved regulation, more effective monitoring, and most importantly, establish a platform to capture more minerals in-country and generate tax.

(c) Contribution to employment and platform for wealth creation (SDG 1: No Poverty)

A second, and interrelated, contribution a more formalized ASM sector would make to the SDGs in sub-Saharan Africa is "legitimated" employment. At present, only vague projections of ASM workforce sizes have been made, which even officials at the United Nations Economic Commission for Africa concede to be significant *underestimates* (UNECA, 2015b) but overall, there could be as many as 20 million people employed directly in the sector in the region. The figures compiled for individual countries do, however, underscore – even if nowhere close to the *actual* numbers – how important the sector is as a source of direct employment in some of the poorest sections of sub-Saharan Africa. Recent studies have provided valuable insight into the wide-ranging backgrounds of the individuals the sector employs, a testament to its ability to create jobs and simultaneously alleviate hardship with minimal capital inputs. Specifically, since the *International Roundtable on Artisanal Mining*, where again, the link between ASM's growth and poverty was made for the first time, studies conducted in sub-Saharan Africa (e.g. Dreschler, 2001; Hilson and Garforth, 2013) have shown that a range of people, including farmers, redundant large-scale mine laborers, former public sector workers and

[14] https://minerals.usgs.gov/minerals/pubs/commodity/cobalt/cobalt-supply-security.pdf

individuals with university degrees, pursue employment in the sector. Additional estimates, calculated from research conducted at specific sites across sub-Saharan Africa, have since emerged, helping to construct a fuller picture of the sector's impact on employment. For example, in Karamjo, one of Uganda's poorest regions, artisanal gold mining provides an estimated 22,500 miners with an annual income that is significantly above the national average, and in the wider Kampala area, more than 90,000 informal clay miners and brick-makers produce about eight billion bricks, an annual production value that is in the range of US$500 million (Barreto et al., 2018c). Figures compiled by Barreto et al. (2018d) for selected ASM sites in Kenya suggest a similar level of impact. Here, in the case of construction materials, quarrying (extraction of stone) employs an estimated 40,000 directly, and in Nairobi alone, provides jobs for 10,000 men and women. Moreover, in localities such as Migori District, informal gold mining and processing sites employ in the range of 10,000 people.

But these figures and studies alone do not capture fully the sector's economic importance in rural sub-Saharan Africa. There are two interrelated and often overlooked means by which "there is potential in these areas for small-scale mining in these areas to have a domino effect on the local economy, with revenues being reinvested locally" (Bastia, 2004, p. 11). The first is the sector's ability to spawn downstream and upstream economic activities, an issue which is at the heart of the extractive industries and development debates in sub-Saharan Africa. Although not the intention here to compare both branches of the mining sector, as already explained, its large-scale segment is often described as an "enclave" in reference to its capital-intensive nature and the difficulties it has with catalyzing downstream and upstream linkages (Ferguson, 2006; African Union, 2009; Ackah-Baidoo, 2012). The *Atlas* acknowledges this, and attempts to argue why locally, for mining companies, there is "a business interest in supporting skills and innovations that feed back into the mining process, there is less of an incentive for them to support spillovers into other sectors," and how "they can take a proactive approach to prioritizing these horizontal linkages by collaborating with government and other sectors to promote and reward first mover companies that invest in research and development to adapt mining technologies to other sectors" (p. 43). Significantly, the local economic contributions made by large-scale mining companies vary and are generally contingent upon the terms negotiated with governments. Companies are not always "proactive" in the way the *Atlas* implies, particularly in poorly-regulated rent-seeking environments such as sub-Saharan Africa. Many host governments have been forced to develop and rely on an emerging Local content agenda, popularized by the AMV, to ensure that the industry supports communities affected by mining large-scale mining activities and the nation more broadly.

The ASM sector, however, does not require such intervention because it stimulates the growth of ancillary industries on its own, even in situations where capital investment is at a minimum. A quick glance at a typical ASM community in sub-Saharan Africa will reveal as much: merchants selling everything from food to spare parts; mechanics who service machinery; motorbike owners who taxi people to sites; and buyers. In ASM *speak* this has been dubbed the sector's "multiplier effect," and while its scale is rarely examined in much detail, the literature does offer a glimpse of the linkages the sector catalyzes and types of upstream/downstream industries it creates in sub-Saharan Africa. For instance, Tsurukawa et al. (2011) describes how, in Katanga Province in the DR Congo, the "commercial vehicle fleet necessary for the transport of ores [has] resulted in an increased number of gas stations and garages, and created job opportunities for countless fuel and lubricant sellers, welders, boilermakers, ironworker, tyre-repairer etc…[as well as] Traders [who] have also increasingly recourse to internet for transactions, and cybercafés are now flourishing" (p. 43). A similar picture is painted by Dessertine (2016, p. 437) who, based on fieldwork conducted in ASM communities in Faralako, Guinea, describes how "One often hears the gold miners repeating that you can find "everything" at the mines," and observing "several bar-cafés, which were full every evening but also, near the mining area, vendors selling motorcycles, mobile phones, clothes and utilitarian objects of all kinds (soap, buckets, tubes, etc.)." In Rwanda, Barreto et al. (2018b) report that in 2015, US$39.5

million was injected into local economies via miners' incomes, providing a stimulus for grassroots enterprises, providing markets for farm output, and enabling households to meet family needs. This is particularly visible in the cassiterite and tantalite-producing Mududu Village, which boasts "a diversified economy of small shops, canteens, and restaurants, with a significant number (given the population) of relatively new *boda* taxis (motorcycles)," and where "individual sub-contractors report that mining has enabled them to significantly improve their socio-economic status, with contributions ranging from buying land and building a house for themselves or their parents, to paying children's school fees (including up to university level), to investing in other income-generating activities (e.g., purchasing lorries for hire, carpentry businesses), thereby further extending employment contributions to the wider economy" (p. 18).

This leads to the second means by which ASM has had a "domino effect" in sub-Saharan Africa: how it has become what Hilson (2016) refers to as a "platform for wealth creation," spawning "legitimate" entrepreneurship and catalyzing sustainable economic linkages locally. It has often been reported (e.g. Labonne, 2003; Hilson, 2012c) that millions of Africans, once engaged in ASM, find themselves under the clutches of those who control the informal "spaces" in which activities proliferate and consequently, become trapped in a vicious cycle of poverty. While this certainly holds true for many, others have managed to adapt to their difficult working environments and position themselves to accumulate earnings and reinvest them prudently, additionally dispelling the popular view that artisanal miners squander their monies on alcohol, drugs and prostitutes. This has, very significantly, required maneuvering skillfully within informal "spaces" which, as indicated, in the absence of regulations, are controlled by a host of local-level actors. In Burkina Faso, for example, Werthmann (2009) reports that female miners invest their earnings, typically in their home towns, in plots of land, on which they build houses which they rent out. In gemstone-producing localities in Madagascar, this type of investment, explains Walsh (2003), is referred to as "cool" money, in reference to how women "put their money to work" by spending it wisely on housing and other significant investments such as cattle. Similarly, Hilson and Garforth (2013), Mawowa (2013), and Dondeyne and Ndunguru (2014) describe how, respectively, in Ghana, Zimbabwe and Mozambique, informal ASM operators have used their earnings to pursue new business ventures onsite such as chemical dispensaries, open up restaurants and hotels, and to foray more into agriculture.

Perhaps nowhere is ASM's "domino effect" more visible than with development minerals, the low-value commodities being extracted on an artisanal and small scale that have been overshadowed by analysis of activities linked to the extraction of diamonds, gold and colored gemstones. The recently-launched ACP-EU Development Minerals Program has provided much-needed visibility for these commodities, which range from industrial minerals (e.g. gypsum and salt), through construction materials (e.g. sand and gravel) and dimension stones (e.g. marble and granite), to semi-precious stones (e.g. garnet, amethyst and tourmaline).[15] In sub-Saharan Africa, these commodities are also mostly being extracted informally but importantly, are predominantly marketed and sold locally, in the process, generating significant added value at the community level. For example, an aggregate is "a high-bulk, low unit value commodity" and therefore "derives much of its value from being located near the market and thus is said to have a high 'place value'" (Langer et al., 2004, p. 8). Similarly, some colored gemstones "may not be of high enough value to export or facet and instead may service local markets, especially in the vicinity of the tourist industry" (Hilson, 2016b, p. 13).

Recent research carried out under the auspices of the ACP-EU Development Minerals Program, and complementary assessments, reinforces these claims. For example, a study commissioned in Uganda (Hinton et al., 2018) reports that an estimated 390,000 people are engaged directly in ASM, which is

[15] "ACP-EU Development Minerals Programme," www.developmentminerals.org (Accessed 12 December 2018).

"largely informal throughout the country and its development contributions, risks and opportunities have been, to a great extent, invisible" (p. 6) because it is unsupported by the government. Here, agrolime is being extracted on a small scale, with producers in both the localities of Muhokya and Tororo selling low-grade overburden to sugar refiners in order to help neutralize soils as needed for sugarcane production. The authors also report that there are other potential industrial applications in the country, including talc, mica, feldspar, clay and fluorspar. Relatedly, in Zambia, there are a number of crushed stone projects and quarries, each supplying fine and course aggregates for road construction and buildings. Moreover, as Tychsen et al. (2018) explain, people are mining, informally, black and green tourmaline, and pink quartz in the Nyimba area at Hofmeyer; quartz, which is also used by local constructions trades, in the Muchinga and Northern Provinces; and in Solwezi, along the Lunga River, more quartz that is exported to China.

Many of these activities are carried out seasonally, typically alongside farming. This is the third contribution examined here, specifically how the linkages between these two activities support the region's rural economies.

(d) Links with agriculture (SDG 2: End Hunger; SDG 5: Gender Equality)

A final issue investigated here is the inseparable linkages ASM has with agriculture in sub-Saharan Africa (Maconachie, 2011; Hilson 2016). Over the past two decades, a sizable body of analysis has emerged which explores the connections between the two activities. Much of this work was initially driven by the realization that in many countries, structural adjustment and market liberalization played a role in "hollowing out" the state, which induced widespread unemployment and has made agriculture a challenging enterprise for poor smallholders (Weng et al., 2015). Detailed research carried out in Ghana (Okoh and Hilson, 2011; Hilson and Garforth, 2012), Tanzania (Fisher et al., 2009; Bryceson and Geenen, 2016; Aizawa, 2016), Senegal (Persaud et al., 2017), Liberia (Hilson and Van Bockstael, 2011), Mozambique (Mondlane and Shoko, 2003) and Zimbabwe (Mkodzongi and Spiegel, 2018), confirms that ASM has become an important supplementary income to farming, and a key economic activity relied upon by households, especially during periods of hardship. These findings are further supported by abundant evidence which draws attention to the inter-locking nature of the agricultural and ASM sectors, and their tendency to 'dovetail' one another in many sections of sub-Saharan Africa (Maconachie and Binns, 2007; Banchirigah and Hilson, 2010; Kamlongera, 2011). Individuals engaged in ASM and farming often "straddle" both activities throughout the course of their lives, continuously striking a balance between the two. For many of the region's poverty-stricken groups, doing so is the key to their survival, particularly when suddenly confronted with difficult circumstances (Maconachie and Hilson, 2018). When this body of research is nuanced further, however, what becomes even more clear what impacts a movement from farming into informal ASM has had at the household level in sub-Saharan Africa. These contributions, the two most important of which will be reviewed here, further solidify the case for formalizing ASM and making it more of a point of emphasis in the region's programs and plans built around the SDGs.

The first contribution that must be emphasized is how a "branching out" into ASM has changed the fortunes of women engaged in agriculture. While sub-Saharan Africa is a mosaic of cultures, each underpinned by different beliefs and norms, a major concern voiced in donor circles about the region as a whole since the launch of the MDGs is gender inequality. A burgeoning body of analysis has since emerged (e.g. Baliamoune-Lutz and McGillivray, 2015; Tibesigwa and Visser, 2016; Njoh et al., 2017) which explores gender inequality in sub-Saharan Africa in considerable depth, from which it is very clear that it is deeply-rooted problem that persists region-wide. Reflecting on the issue generally, the *Africa Human Development Report 2016 Accelerating Gender Equality and Women's Empowerment in Africa* (UNDP, 2016b) explains that "Because social norms and beliefs assign African women and girls the primary responsibility for care and domestic work, women, on average, spend twice as much time

as men on domestic work – child and elderly care, cooking, cleaning, and fetching water and wood" (p. 5). Despite the common perception that women in sub-Saharan Africa are wholly dependent on their husbands and male relatives, the evidence suggests the opposite: that in many cases, they bear far *greater* responsibilities than the men in their families (Falola and Amponsa, 2012). For this reason, they need to be supported and in ways which are compatible with local cultures.

Women's marginalization is particularly visible in the region's agricultural space, which has significant implications for development. In sub-Saharan Africa, an estimated 60-70% of food is produced by women but most struggle to so because of gender-based norms that limit their access to capital productive inputs (SDGC, 2017). This has proved particularly challenging for at least two-third of the region's women who engage in agriculture, 80% of whom are subsistence farmers. In countries such as Ethiopia and Nigeria, where 80% of cultivated land is in the hands of men, moves made to increase the sizes of agricultural plots in a bid to stabilize farm production led by women are rarely successful. Similar challenges persist in Malawi and Niger, where, respectively, 70% and 53% of land is controlled by men, as well as in Tanzania, where women are solely in charge of only 24% of land, and in Uganda, where they control only 38% (Deininger et al., 2018). The inability of women in sub-Saharan Africa to secure land as well as access a steady stream of agricultural inputs such as fertilizers has hampered farm production considerably. This has perhaps been most visible with cereal crops, the production of which, because of these constraints, amounted to less than half of South Asia's and was one-third of Latin America's output in the mid-2000s (Chauvin et al., 2012).

Women's simultaneous engagement in informal ASM activities, however, has in part helped them to overcome these constraints. The dominant narrative around women's engagement in ASM activities in sub-Saharan Africa is that they mostly populate the lowest rungs of the labor hierarchy and are prevented from ascending to some of the sector's higher-paying jobs. There is certainly evidence that confirms that this if often the case. For example, in Zambia, Tychsen et al. (2018) report that "When it comes to the participation of women in the ASM sector, socio-cultural and physical barriers, such as the harsh conditions which miners are subjected to and the traditional and cultural beliefs that discourage women from taking the lead in economic activities, prevent women's effective participation in informal mining activities" (p. 52). Barreto et al. (2018d) report much of the same from Orisi, an artisanal gold mining locality in Kenya. Here, the authors explain, the division of labor has significant gender implications when it comes to the distribution of benefits from working in the mine: women mostly work in the lowest paid jobs (e.g. crushing), earning US$78/monthly per month), are largely excluded from the more lucrative work in mill operations (jobs that fetch US$1560/month), and consequently generate only 11% of the revenue share despite comprising 38% of the workforce. In Rwanda, Buss et al. (2017) report that "Women's participation in mining livelihoods," which is "somewhat of a departure from the rural norm," is constrained by what the authors refer to as a "double burden." On the one hand, here, because ASM "is a non-agricultural sector that is…seen by some in the community as inappropriate for women," and are therefore constrained from "improving their own economic potential." On the other hand, the "work possibilities at ASM zones for women were also strongly shaped by pressures on them by their families, households and the wider community concerning their gendered duties. It is clear that for many women, their participation in artisanal mining is shaped by a combination of productive and reproductive roles" (pp. 34-35). Barreto et al. (2018b) also explore this in the case of Rwanda:

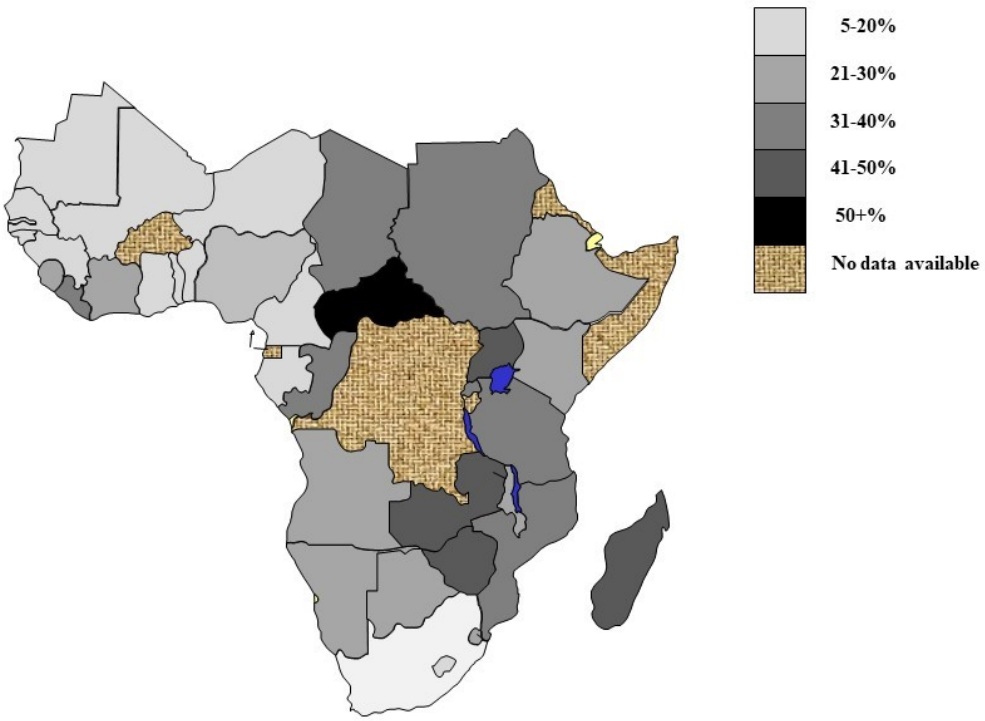
> …[In Gifurew,]…Women miners conveyed how their work in the mines enabled them to buy livestock, provide financial support to their parents, and other benefits that they saw as an improvement from their previous work in farming…[and] As agriculture and mining visibly co-exist around COMIKAGI, much of the food consumption component of poverty line determination is likely to be met through subsistence agriculture, much of which is provided through the labour of female household members, and potentially providing some (although not all) explanation for women's low participation in the sector. [p. 21, 23]

But at the same time, despite earning less than men, women do, in many cases, view their move into ASM as empowering and the main reason why they are able to sustain the agricultural cycles they drive. One of the more illustrative examples of this is Sierra Leone, where women have managed to gain control of the artisanal gold panning sector, into which they have moved very easily as men are more preoccupied with mining diamonds. Here, many women in localities such as Makeni use their earnings from gold mining to finance agricultural "businesses" and trading ventures, and use their income derived from planning to purchase a wide range of fresh foodstuffs from nearby villages, including cassava, oranges, limes and mangoes, which they transport to the country capital of Freetown to sell for much higher prices at the Calabar Town market (Maconachie and Hilson, 2011). Women's "success" in generating earnings from ASM to support their agricultural ventures and other businesses, however, may be due to the maneuverability they have been afforded targeting *other* minerals: in Zambia, semi-precious amethyst while others target emeralds; in gold-rich Ghana, salt; and in the aforementioned Sierra Leone, as indicated, gold when most mining policies and activities revolve around alluvial diamonds. In short, formalizing and supporting ASM is not necessarily a direct and fully-replicable means for empowering women in these, and other, environments. But it is a step in the right direction as it supports them in their endeavors as farmers, and in the area of agricultural development, represents one fairly easy way to "empower women economically, increase food security, improve incomes and livelihoods, and contribute to Africa's broader economic growth" (ADB, 2015, p. 9).

The second contribution, though slightly more speculative though nevertheless promising, is the direction in which research that explores the linkages between farming and ASM in sub-Saharan Africa *should* be trending: work which explores the sector's impact on food security. Most of the studies identified here point out how engagement in ASM has positioned families to acquire agricultural inputs such as fertilizers and pay for laborers, as well as increase the sizes of their plots. While this very clearly supplies a household with increased supplies of food and potentially more revenue, in the process, making it better able to cope with shocks and stresses, the links between ASM, agriculture and food security, and how this builds resilience in rural sub-Saharan Africa, have yet to be fully articulated. It is a region plagued by erratic weather, recurrent drought and flooding, conflict and poor soil fertility. Combined, these factors have constrained agricultural production on 33 million farms of less than 2 acres in size in sub-Saharan Africa, or 80% of the region's agricultural plots (NEPAD, 2013).

The data paint a bleak picture of the state of undernourishment in sub-Saharan Africa (Figure 3). During the period 2015-2016, the number of people undernourished in sub-Saharan Africa rose from 200 to 224 million, which represented 25 percent of the 815 million people undernourished in the world at the time (FAO, 2017). Formalizing an ASM sector which is now heavily relied upon by hundreds of thousands of – predominantly poverty-driven – rural African families to support their subsistence agricultural practices speaks directly to SDG 2 ("End hunger, achieve food security and improved nutrition and promote sustainable agriculture"). A key point to make about the growing body of literature which explores the links between ASM and farming in sub-Saharan Africa is how this phenomenon persists across a range of micro-climates: from the semi-arid stretches of Mali, through to the more tropical climates of Ghana and Tanzania. The impact of this livelihood diversification on food security, along with women's empowerment, is an area where ASM, even in an informal state, aligns closely to what the SDGs are attempting to achieve in sub-Saharan Africa and more generally.

Figure 3: Concentrations of malnourishment in sub-Saharan Africa



Source: World Bank Indicators

There are also other very obvious ways in which, in even a predominantly informal state, ASM contributes to the SDGs in sub-Saharan Africa, including how it engages idle youth, generates income families need to pay school fees, and how it catalyzes local infrastructural development. These impacts would only be more widely felt if the sector were fully formalized and backed by host governments (Figure 4). The sector's three contributions highlighted here – ASM's contribution to mineral production, impact on employment and the implication of its links with agriculture – are among the more obvious and significant in sub-Saharan Africa, and which resonate most powerfully with the region's SDG agenda. The next and final section of the article identifies ways in which host governments and donors can go about making a formalized ASM sector more of a centerpiece of SDG strategy in sub-Saharan Africa, and what must change in order for this to happen.

Figure 4: Formalized artisanal and small-scale mining sector and its potential contribution to the SDGs in sub-Saharan Africa

4. Conclusion and Recommendations

When will the benefits that a formalized ASM sector provides be fully realized in sub-Saharan Africa? It is unlikely to happen without a wholesale change in mindset toward ASM, including: 1) a renewed commitment on the part of governments, beyond rhetoric, to supporting the sector; and 2) an understanding that the region's extractive industries and development strategies must extend beyond simply promoting foreign-financed large-scale resource extraction, and that such an approach is not necessarily in the best interests of host countries.

The *Mapping Mining to the Sustainable Development Goals: A Preliminary Atlas* (UNDP, 2016a), the contents of which have been critiqued throughout this article, is confirmation of how little the thinking has changed about extractive industries and development in donor and policymaking circles, even with the emergence of a dynamic set of targets such as the SDGs. The document explains how capital-intensive large-scale scale mining can contribute to the SDGs. At the same time, it intentionally avoids examining ASM in this context on the grounds that the sector "warrants a separate guide and review to map the opportunities on how ASM can contribute to the SDGs," furthermore explaining that "artisanal and small-scale mining is discussed when it directly relates to LSM [large-scale mining]" (p. 16). The irony of this conscious decision, however, cannot be taken lightly: how full realization of the benefits the *Atlas* associates with large-scale mining in developing countries hinges upon the effective management, regulation and support of ASM. Both populate the same landscapes but the failure of governments and donors to formalize ASM, and implement user-friendly policies and legislation for its operators, has, at least in the case of sub-Saharan Africa, pushed most into the informal economy where, without security of tenure, they have come into direct contact with large-scale operators. These confrontations have erupted into conflict in locations such as DR Congo, Mali, Ghana, Tanzania

and Mozambique, which has provided the context for ASM "to be discussed when it directly relates to LSM [large-scale mining]" in the *Atlas*.

In poor regions of the world such as sub-Saharan Africa, the maximization of economic and societal impacts from mining hinges upon overarching policy frameworks such as the SDGs recognizing and responding to the contributions of all branches of particular industrial sectors. In the case of extractives, this includes *both* large-scale mining and ASM, each of which has a very different impact, developmentally. It is no secret that the most significant "game-changing" contribution the former makes is at the macro-level, specifically, through the revenue it delivers to host governments. At the same time, its community-level benefits in developing countries are not as visible and less forecastable, as the types and scale of contributions made are contingent upon the negotiations an individual company has with a host government. The *Atlas* does qualify opinions voiced about the sector contributing positively at the local level with the word "potential," as well as stresses the importance for projects to adhere to high environmental and social standards, although it is unclear what added value this provides in the rural areas where they are mostly located. The ASM sector, however, has an enormous impact at the local level, the most visible of which, in the case of sub-Saharan Africa, were examined in this article. When these contributions are articulated, it becomes clear how a formalized and supported ASM sector can help host African government meet economic and development targets informed by the SDGs.

While there seems to be a growing appreciation in donor and government circles of ASM's economic importance and its "livelihoods" dimension in rural sub-Saharan Africa, the sector continues to be ignored in the region's development policy agenda, including dialogues on the SDGs themselves. A likely reason why is because there are insufficient data on hand to make informed decisions. How can a formalization scheme be implemented for ASM without knowledge of how many people are mining and why, how much they are producing, and who is working and where, let alone designed in a way which speaks specifically to the SDGs? The first step, therefore, is to collect detailed information about the sector which can be mapped on to the SDGs. In 2016, the World Bank and the international NGO, PACT, joined forces in a bid to recognize and address the ASM data shortage problem. The organizations launched the DELVE Platform, a repository conceived specifically to encourage a sharing of data on ASM. As indicated, most of the ASM census and production data available on sub-Saharan Africa are outdated, which paint an unrepresentative picture of the sector, and at times, have spawned inappropriate policy interventions. With most of the sector being informal, data have, understandably, been difficult to collect. The DELVE platform seeks to bring together the disparate analysis of ASM being conducted across the academic and NGO communities, and private and public sectors.

Projects which aim to gather data on ASM in sub-Saharan Africa are unlikely to encounter much resistance because it is a problem which host African governments and donors can relate to. The demands of the SDGs have magnified the challenges with gathering information in sub-Saharan Africa, where many countries "lack the capacity to collect, manage, and report on demographic, social, economic, and environmental data," which is "critical for governments to be able to develop better policies and interventions and respond more effectively to their national development challenges" (SDGC, 2018, p. 5). The region has the lowest average statistical capacity, and on average, the typical African country conducted only 1.6 comparable demographic surveys between 1990 and 2012 (Beegle et al., 2016). To improve the traction of the data collection, ASM surveys could be built into interventions purposely implemented to address the SDGs around overlapping themes such as gender, youth and food security. Carrying out these survey exercises under the auspices of DELVE would further improve their sustainability.

Once data are gathered, more appropriate ASM formalization and support strategies can be designed and implemented with the SDGs in mind. There is development architecture within which schemes can be nestled, foremost the AMV, which again has as one of its core objectives "Boosting Artisanal and Small-Scale Mining." Moreover, although failing to showcase ASM in the way it deserves, regional development policy machinery, such as certain PRSPs and NEPAD Vision, do recognize the importance of extractive industries and development. A policy foundation is in place, therefore, for carrying out more comprehensive work on ASM formalization. This includes implementing schemes which can speak to some of the core themes of the SDGs such as food security, gender and the environment, in the process providing the traction needed in policy to ensure their effectiveness long term.

There may never be a better time to showcase ASM's economic importance in sub-Saharan Africa than now. Momentum to develop formalization strategies in the region that speak to the SDGs and which closely align with the objectives of the AMV has been building since the United Nations Economic Commission for Africa (UNECA) hosted the international workshop *Building Capacity for Environmental Sustainability in Artisanal and Small Scale Mining in Africa United Nations Economic Commission* at UNECA Headquarters in Addis Ababa, 24-26 May, 2017. The significance of the event is captured in the following passage:

> It has become a cliché to present formalisation as a silver bullet for challenges faced within ASM, whether environmental, financial, social or technical. Whilst it is a misleading notion to view formalisation as the heart of addressing all and sundry major challenges in ASM – when countries work towards formalisation and do it systemically, it does offer pathways that align to the…championed 'golden triangle' support for ASM. The triangle is a set of pillars distilled from the tenets of the AMV in espousing a sustainable ASM sector. The three service pillars are technical, finance and marketing services directed towards ASM within a supportive, dynamic policy and regulatory environment. [UNECA, 2017, p. 6]

While SDGs were not designed with ASM in mind but offer an element of flexibility which their predecessors, the MDGs, simply did not provide. The vagueness of the SDGs, which for some, is their major shortcoming (e.g. Murray, 2015; IISD, 2016), is seen here to be an advantage because provides a rare opportunity to revisit broader development challenges, scrutinize the policies implemented to tackle them and pursue ideas – in this case, the formalization of ASM – that were overlooked at the time of their design. An additional criticism of the SDGs is that there are far too many targets and that most are overly-ambitious (Liverman, 2018). But it seems that UN officials do recognize the magnitude of the work that will be needed to meet these targets, and in response, have developed guidance documents and principles where needed, as well as organized international, regional and national-level committees to assist governments. Two that are particularly relevant in the case of ASM in sub-Saharan Africa is the UNDP's *Roadmap for Localizing the SDGs: Implementation and Monitoring at Subnational Level*, and the creation of the UN's High-Level Political Forum. The former aims to "support local and governments and their associations to implement and monitor the SDGs and to influence national policy-making with a view to creating an enabling environment for action at local and regional level" (p. 2), while the latter "is tasked with ensuring the integration of the three dimensions of sustainable development in a holistic and cross-sectoral manner at all levels" (Stafford-Smith et al., 2016). The existence of these panels and guidelines makes it possible to develop and interrogate ASM formalization strategies in sub-Saharan Africa, with a view to helping to meet regional targets linked to the SDGs.

To conclude, this paper has built a case for formalizing ASM in sub-Saharan Africa on the grounds that doing so would alleviate significant poverty and bolster economic growth in the region. In doing so, it drew attention to the sector's ability to generate revenue, its importance as a source of employment,

and its connections to subsistence farming, three of its most obvious impacts, each of which maps on to the core themes underpinning SDGs. A systematic unpacking of these, and related, contributions certainly warrants the drafting of a separate Atlas but not for the reasons identified in *Mapping Mining to the Sustainable Development Goals: A Preliminary Atlas* (UNDP, 2016a). In poor regions of the world such as sub-Saharan Africa, the developmental impacts of ASM are very different to those of large-scale mining. But for the impacts of either to be realized and any mining-led development strategy to be successful in the region, very different policies must be developed, monitored and regulated in unison and, with the goals of each in mind.

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